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and advocate either polygamy or free love, his honesty of purpose, his right to teach his views, would not protect him from dismissal. This is an extreme case, a case not likely to arise, but it serves to illustrate the principles at issue. All the rights of the professor are governed by reasonable limitations.

Unfortunately, at the present time, the leading economic and social questions are partly political in their nature. Their public discussion is almost wholly partisan, rarely scientific, and violent passions are easily aroused. The tariff, the coinage, the question of the so-called trusts are all alive in the public mind, and the professor of economics therefore stands on very precarious ground. What are his rights and his duties now? They are still limited, and his responsibilities are greater than ever.

Whatever a teacher may be in his private life, his personal bias is to be put under strict control the moment he enters his lecture room. There the partisan is out of place, and the interests of science rule. The professor now should cease to be an advocate, seeking to win converts, and become the equivalent of a judge who sums up the case before a jury. He must be fair, judicial, tactful and dignified; and failure in any one of these particulars is a serious limit to his usefulness. He may believe in free trade, but he should give the evidence and arguments upon both sides of the question. If he neglects to do this he defrauds the students of their rights and is a failure as a scientific teacher. He need not efface himself, he need not suppress his preferences, but he must be fair and thorough. The pupil can not understand an economic controversy without hearing both sides, and his rights in this respect are entitled to consideration. The class-room is no place for political tirades, nor for partisan denunciation, either of institutions or of individuals; it should be sacred to honest scientific discussion, regardless of parties or persons. A want of tact upon the part of the teacher, a lack of dignity in his treatment of a doubtful question, may easily become a source of trouble and justly lead to his dismissal.

That some teachers may have been unfairly treated I will not deny, for in the conflict of

rights it is sometimes difficult to strike an even balance. What I have said applies to general principles, not to any special, concrete cases. Each case stands upon its individual merits, which are rarely known except to the parties who are immediately affected. The principles, however, are clear, and should be borne in mind whenever the management of a university is criticized. The latter may be in the right, despite appearances; and it is quite conceivable that a teacher may be in the wrong.

F. W. CLARKE.

SHORTER ARTICLES.

THE RELATION OF SEEDINESS TO QUALITY IN MELONS.

IN the *Memoirs of the Torrey Botanical Club*, Vol. 1, No. 4, issued May 30, 1890, the late Dr. E. Lewis Sturtevant contributed an article on 'Seedless Fruits' in which he presented a large amount of data compiled from various sources relative to seedless fruits as correlated with quality. Some of his statements I quote as follows: "There seems to exist in fruits a correlation between seedlessness and quality, especially when that quality is expressed by the term tenderness of tissue." "The better varieties of the apple usually contain some abortive seeds, and are sometimes individually to be found seedless. As a rule, where there is a tendency to abortive seeds, the larger and finer the apple the greater the number of abortive seeds." "Melons of the highest quality contain fewer seed than do varieties of medium or inferior quality, as I have often observed. This even seems to hold true as between individual fruits of the same variety to a marked extent."

In the autumn of 1893, my assistant, Mr. Cranefield, made a study of thirty-five muskmelons to ascertain to what extent Dr. Sturtevant's conclusions would be verified. The data have been preserved, but the results have not before been published.

These melons were the result of a cross between the Algiers cantaloupe and several American varieties. The fruits were picked when the stem readily detached, and weighed on a torsion balance that is sensitive to the

tenth of a gram. They were then cut into halves and the seeds were taken out and weighed with the adhering pulp, after which the seeds were removed from the pulp, wiped as dry as possible on a towel and weighed. The percentage of seeds was computed by dividing the weight of the seeds by the weight of the melon. The diameter of the melon was then measured, also the thickness of the flesh and of the rind. The flesh was then tested for firmness, texture and flavor. The flavor was rated on the scale of five as best.

In five melons rated poorest in flavor, the weight of the seeds averaged 1.636 per cent. of that of the melon; in five rated of best quality, the weight of the seeds averaged 1.34 per cent. of that of the melon.

In five melons of 'coarse' texture, the weight of the seeds averaged 1.764 per cent. of that of the melon; in five of 'fine' texture, the weight of seeds averaged 1.364 per cent. of that of the melon.

In five melons having the thickest flesh, the weight of the seeds averaged 1.53 per cent. of that of the melon; in five having the thinnest flesh, the weight of seeds averaged 1.54 per cent. of that of the melon.

In five of the heaviest melons, the weight of the seeds averaged 1.34 per cent. of that of the melon; in five of the lightest, the weight of the seeds averaged 1.684 per cent. of that of the melon.

It appears that so far as texture of flesh and flavor are concerned, Dr. Sturtevant's conclusions were verified.

E. S. GOFF.

WISCONSIN AGRICULTURAL EXPERIMENT STATION.

PREDETERMINED EVOLUTION.

THE American Redstart (*Setophaga ruticilla*) is structurally very widely separated from the true Redstart (*Ruticilla phœnicurus*) of Europe, and yet outwardly resembles it to an extraordinary degree. This fact has caused Professor Alfred Newton (*Ency. Brit.*, XX., 318) to write as follows: "The wonderful likeness, coupled of course with many sharp distinctions, upon which it would be impossible to dwell, between the birds of these two genera of perfectly distinct

origin, is a matter that must compel every evolutionist to admit that we are as yet very far from penetrating the action of creative power, and that especially we are wholly ignorant of the causes which in some instances produced analogy."

Cases of this sort may excite our wonder, but they are much more common than is often realized. In New Mexico and Arizona we have a series of numerous species of snails, which possess shells in no way distinguishable, except in a specific sense, from those of the genus *Polygyra*, which is dominant in the eastern States. During the last two years the anatomy of several of these species has become known, and it turns out that they are not even closely allied to *Polygyra*, but represent a peculiar genus which has been named *Ashmunella* (Pilsbry and Cockerell). In Arizona and southern New Mexico there is another series of snails, which has nearly the shell of *Epiphragmophora*, a genus of the Pacific coast. The species were always referred to the last-mentioned genus until Professor Pilsbry recently dissected one of them, *E. hachitana* of Dall. It then appeared that we had here another perfectly distinct genus, which was named *Sonorella* (Pilsbry). But not only do these interesting resemblances occur between species of our continent; they are seen equally between species of different continents. Some of the California species of *Epiphragmophora* so closely resemble the European *Arionta* that naturalists were for a long time deceived. I have recently had occasion to notice the extraordinary resemblance between certain Japanese snails and those of the United States. Thus, *Eulota connivens* (Pfr.) of Japan might easily be taken for *Sonorella hachitana* of Arizona; and *Eulota mercatoria* (Gray) is remarkably similar to *Epiphragmophora fidelis* (Gray), the first being from Japan, the second from Oregon.

Is it possible that we may find a real, if imperfect, parallel between this independent development of similar species and the development of diverse cells in the metazoa? A human being, for instance, contains innumerable cells of very diverse nature, all descended directly from the ovum or germ-cell. If these cells were not parts of an organic whole, but lived separate lives, we should speak of their descent